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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NUCLEIC ACID CONSTRUCTS AND METHODS FOR PRODUCING ALTERED SEED OIL COMPOSITIONS

(57) Abstract: The present invention is in the field of plant genetics and provides recombinant nucleic acid molecules, constructs, and other agents associated with the coordinate manipulation of multiple genes in the fatty acid synthesis pathway. In particular, the agents of the present invention are associated with the simultaneous enhanced expression of certain genes in the fatty acid synthesis pathway and suppressed expression of certain other genes in the same pathway. Also provided are plants incorporating such agents, and in particular plants incorporating such constructs where the plants exhibit altered seed oil compositions.

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INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : A01H 5/00; 5/10
US CL : 800/312
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 800/312

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST, BIOSIS AGRICOLA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,714,670 A (FEHR et al) 3 February 1998 (03.02.1998), column 25, line 42.	1

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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International application No.
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Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1

Remark on Protest
☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1, drawn to a non-recombinant soybean seed having comprising 55-80% by weight oleic acid, 10-40% by weight linoleic acid, 6%or less by weight linolenic acid, and 2 to 8% by weight saturated fatty acids.

Group II, claim(s) 1-6, drawn to a transgenic soybean seed having specified levels of fatty acids.

Group III, claim(s) 7 and 13-21, drawn to soybean oil.

Group IV, claim(s) 8, drawn to soybean meal.

Group V, claim(s) 9, drawn to a container of soybean seeds that is at least 25% comprised of soybean seeds having a specified fatty acid composition.

Group VI, claim(s) 10-12, drawn to non-recombinant soybean seed comprising 65-80% by weight oleic acid, 10-30% by weight linoleic acid, 6%or less by weight linolenic acid, and 2 to 8% by weight saturated fatty acids.

Group VII, claim(s) 22, 23, 25 and 26, drawn to a transformed soybean plant having a seed oil composition of 55-80% by weight oleic acid, 10-40% by weight linoleic acid, 6%or less by weight linolenic acid, and 2 to 8% by weight saturated fatty acids.

Group VIII, claim(s) 24, drawn to feedstock derived from the plant of claim 23.

Group IX, claim(s) 27-30, drawn to a transformed plant comprising two sets of DNA sequences.

Group X, claim(s) 31-35, drawn to a method of altering oil composition of a plant cell.

Group XI, claim(s) 36-38, drawn to a method of producing a transformed plant with reduced saturated fatty acid content.

Group XII, claim(s) 39, 45, 53, 54, 57 and 58, drawn to a recombinant nucleic acid comprising a first set of DNA sequences for suppression of at least two genes and a second set of DNA sequences for increasing expression of at least one gene.

Group XIII, claim(s) 40-42, drawn to recombinant nucleic acid comprising a first set of DNA sequences for suppression of at least two genes and a second set of DNA sequences for increasing expression of at least one gene wherein said sequences are noncoding regions.

Group XIV, claim(s) 40, 43 and 44, drawn to recombinant nucleic acid comprising a first set of DNA sequences for suppression of at least two genes and a second set of DNA sequences for increasing expression of at least one gene wherein said sequences are antisense.

Group XV, claims 46-50, drawn to recombinant nucleic acid comprising a first set of DNA sequences for suppression of at least two genes and a second set of DNA sequences for increasing expression of at least one gene and to a third sequence to suppress FAD3-1B.

Group XVI, claims 51 and 52, drawn to recombinant nucleic acid comprising a first set of DNA sequences for suppression of at least two genes and a second set of DNA sequences for increasing expression of at least one gene and to a third sequence to suppress FATB.

Group XVII, claim 55, drawn to a recombinant nucleic acid comprising a first set of DNA sequences for suppression of at least two genes and a second set of DNA sequences for increasing expression of at least two genes.

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Group XVIII, claim 56, drawn to a recombinant nucleic acid comprising a first set of DNA sequences for suppression of at least two genes and a second set of DNA sequences for increasing expression of at least three genes.

Group XIX, claims 59-63, drawn to a recombinant nucleic acid comprising FAD2 and FAD3 genes in antisense.

Group XX, claim 64, drawn to a recombinant nucleic acid comprising FAD2 and FAD3 genes in antisense further comprising a spacer to form double stranded DNA.

Group XXI, claims 65 and 66, drawn to a recombinant nucleic acid comprising FAD2 and FAD3 genes in antisense further comprising a spacer to form double stranded DNA wherein a spliceable intron is the spacer.

Group XXII, claim 67, drawn to a recombinant nucleic acid with a third antisense sequence to FA3-1B.

Group XXIII, claims 68 and 69, drawn to a recombinant nucleic acid with a third antisense sequence to FATB.

Group XXIV, claims 70-72, drawn to a recombinant nucleic acid with a second set of DNA sequences capable of expressing a CP4 EPSPS.

The inventions listed as Groups I-XXIV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The inventions of Groups I-XXIV lack a corresponding special technical feature as evidenced by the prior art reference of U.S. Patent 5,714,670 (see column 25, line 42), which teaches a soybean seed having the fatty acid profile set forth in claim 1. Therefore, there is no special technical feature that distinguishes the claimed inventions from the prior art. In addition, the products of Groups I-IX and XII-XXIV are each chemically, structurally and functionally distinct one from each of the others; and the methods of Groups X and XI differ one from the other in that they each use different starting materials and result in different products. Furthermore, the products required in the methods of Groups X and XI differ in content and scope from the products of Groups I-IX and XXIV, and there is no corresponding special technical feature.